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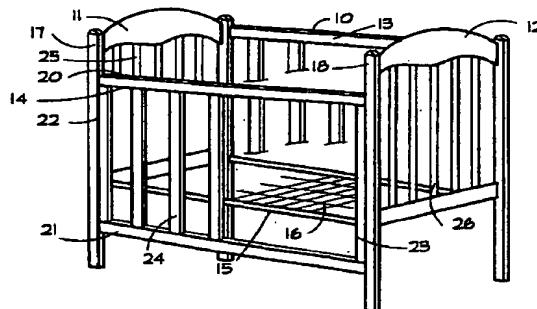
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(54) LIT DE BEBE  
(54) CHILD'S CRIB

(57)

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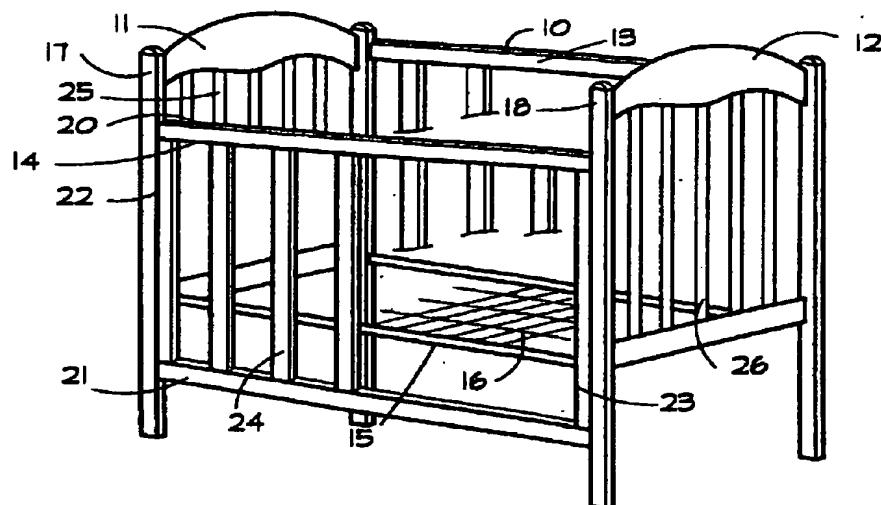


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(54) **LIT DE BEBE**  
(54) **CHILD'S CRIB**



(57) Concealed hardware for controlling the raising and lowering of the crib side, permits the construction of a crib which includes no projecting or exposed parts. The hardware comprises a channel member embedded within the end stiles of the crib side and an engaged coupling element fastened to the adjacent crib end. The channel member restricts movement of the crib side to vertical translation, and includes a latching chamber at the bottom which selectively traps or releases the coupling element when it is desired to secure the crib side in an elevated position.



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1                   **ABSTRACT OF THE DISCLOSURE**

2                   Concealed hardware for controlling the raising and  
3                   lowering of the crib side, permits the construction of a crib  
4                   which includes no projecting or exposed parts. The hardware  
5                   comprises a channel member embedded within the end stiles of the  
6                   crib side and an engaged coupling element fastened to the  
7                   adjacent crib end. The channel member restricts movement of the  
8                   crib side to vertical translation, and includes a latching  
9                   chamber at the bottom which selectively traps or releases the  
10                  coupling element when it is desired to secure the crib side in an  
11                  elevated position.

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## CHILD'S CRIB

## Background of the Invention

**a) Field of the Invention**

The present invention relates to a child's crib having a releasable side that can be raised and lowered at will. More particularly, it relates to such a crib wherein the hardware that secures and controls the movement of the releasable side is completely concealed and inaccessible whether the side is in a raised or lowered position.

**(b) Description of Related Art**

10 For convenience and ease of use, most child's cribs are  
11 provided with at least one side that can be lowered for better  
12 access to the child. While movement of the side changes the  
13 structure of the crib, it must be effected without weakening the  
14 rigidity of the crib assembly. By regulation and practice, it is  
15 now recognized that the mechanism for latching and locking  
16 movable crib sides, should engage automatically and should  
17 require two separate positive and simultaneous actions to release  
18 the locking mechanism that holds the side in a raised position.

19                   Perhaps the most common crib hardware for a releasable  
20        side, is a vertical rod mounted parallel to each crib end post  
21        and extending through grommets in the top and bottom rails of the  
22        side. A latching bar is provided along the bottom rail, which  
23        projects into and engages stationary catch elements on the  
24        surface of the end posts. The latching bar is spring biased and

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1 the catch elements are configured so that simultaneous turning of  
2 the bar and a slight lifting of the side, is required to release  
3 the latch and permit lowering of the side.

4 The presence of exposed hardware is objectionable in  
5 crib structures. Aside from being aesthetical disturbing,  
6 children find hardware a curiosity that demands investigation,  
7 touching and tasting. Exposed hardware projections act to catch  
8 children's garments and crib bedding, and at worst, raise the  
9 risk of laceration. Exposed hardware cavities create the threat  
10 of having a child's tiny fingers pinched as the side is raised or  
11 lowered.

12 There are many crib designs that attempt to minimize  
13 the exposure of babies to the potential attractions and dangers  
14 of crib hardware. For example, the gap between the ends of a  
15 releasable crib side and ends of the crib has been reduced by the  
16 simple expedient of providing posts at the ends of the side, with  
17 mounting hardware coupling the posts to the adjacent crib ends.  
18 U.S. Patent 4,811,436, to Schwartz, illustrates a design with  
19 slotted end posts providing a guide path for spring biased  
20 locking pins in the side posts. U. S. Patent 5,617,593, to Pham,  
21 shows a pin guiding track embedded in the end posts which engage  
22 a spring loaded pin mounted in the side post. Until the present  
23 invention, there has been no successful design that completely  
24 concealed the crib hardware whether the side was in its raised or  
25 lowered position.

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## **SUMMARY OF THE INVENTION**

It is a primary object of the present invention to provide a safe and secure child's crib.

Another important object of the present invention to provide a child's crib with an improved latching mechanism for a releasable side.

Still another object of the present invention is to provide improved latching hardware and guide means for a crib side that remain concealed whether the side is raised or lowered.

The present invention features a child's crib with a releasable side, that contains no exposed hardware for effecting the mounting, latching, or movement of the side.

The present invention also features unique latching and guide hardware adapted for mounting within the end posts of a crib side, to support the crib ends while latching and guiding transitional movements of the crib side.

According to the invention, there is provided a child's crib having a releasable side interposed between crib ends; coupling elements bridge each side and the adjacent end, at the upper and lower sections of each side; the spacing between the coupling elements being less than the height of the side; latching and guide elements are mounted within and below the surface of the side end posts engaging respective coupling elements; whereby the coupling elements are always within the transit path of the side and the latching and guide elements are

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1 concealed in proximity to the end posts at all times.

2                   According to another aspect of the invention, there is  
3                   provided latching hardware for a releasable side crib including a  
4                   guide element, a latching/guide mechanism, and several coupling  
5                   elements; the upper guide element having an elongated slot for  
6                   engagement with one of the coupling elements; the latching/guide  
7                   mechanism having an elongated slot for guiding the other coupling  
8                   element, said slot terminating in a latching cavity with biasing  
9                   means that releasably retain the associated coupling element;  
10                  both the guide element and the latching/guide mechanism being  
11                  adapted for mounting below the surface of an end post of the crib  
12                  side.

## DESCRIPTION OF THE DRAWINGS

14 A particular embodiment of the invention is described  
15 in connection with the drawings, wherein:

16 Fig. 1 is a perspective view of a child's crib  
17 embodying the features of the present invention;

18 Fig. 2 is an enlarged and reoriented view of the crib  
19 end post adjacent to the end of a detached releasable crib side;

20 Fig. 3 is a still more enlarged view of the crib end  
21 post in proximity to the adjacent crib side, broken away to  
22 illustrate engagement between a coupling element and the  
23 latching/guide mechanism of the invention;

24 Fig. 4 is an end view of the lower edge of the crib  
25 side, showing the mounted latching/guide mechanism that controls

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1 raising, lowering and locking of the crib side;

2 Fig. 5 is a view of the housing of the latching/guide  
3 mechanism;

4 Fig. 6 is a cross-sectional view taken along the lines  
5 6-6 of Fig. 5;

6 Fig. 7 is a cross-sectional view taken along the lines  
7 7-7 of Fig. 5;

8 Fig. 8 is an enlarged view of the latching cavity of  
9 the latching/guide mechanism with the latching cam in the  
10 quiescent position;

11 Fig. 9 is a cross-sectional view taken along the lines  
12 9-9 in Fig. 8;

13 Fig. 10 is a perspective view of the latching cam,  
14 removed from the latching chamber of the latching/guide mechanism  
15 housing; and

16 Fig. 11 illustrates a coupling element of the type that  
17 is advantageously used in a preferred embodiment of the  
18 invention.

19 Fig. 12 is an end view of the upper edge of the crib  
20 side, showing the mounted guide element that controls vertical  
21 movement of the top of the crib side and couples the side to the  
22 adjacent crib end.

23 DETAILED DESCRIPTION OF THE INVENTION

24 Fig. 1 illustrates a child's crib 10, comprising the

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1 features of a preferred embodiment of the invention. It includes  
2 end units 11, 12, and side units 13, 14. Although both sides  
3 may be releasably mounted for raising and lowering, for purposes  
4 of the current description, only releasable crib side 14 will be  
5 described.

6 The crib structure includes a stabilizing bar or rail  
7 15 rigidly interconnecting the lower portion of ends 11, 12.  
8 This bar might also optionally support a typical mattress spring  
9 16. A similar bar might be provided on the other side of the  
10 crib.

11 Releasable crib side 14 comprises upper and lower  
12 horizontal rails 20, 21, respectively, interconnecting vertical  
13 side posts 22, 23 and, typically, a plurality of spaced elements  
14 24 which permit visibility through the side and insure safety of  
15 the crib's occupant. Similar vertically spaced elements 25, 26  
16 are shown in ends 11, 12; however, it will be appreciated that  
17 the use of such elements is not germane to the invention.

18 Side posts 22, 23 are adjacent to the proximate ends of  
19 crib 10. It will be noted that there is no visible hardware on  
20 the crib ends 11, 12 or between the side posts 22, 23 and the  
21 ends. This characteristic feature is made possible by the unique  
22 crib design and crib hardware of the present invention.

23 Fig. 2 illustrates an end post 17 of the type typically  
24 supporting and forming part of crib end 11. Structurally, though  
25 not necessary, end post 17 may be one of the legs of crib 10. End

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1 post 17 is shown adjacent to, and separate from, crib side 14, to  
2 which it will be attached in the final crib structure. Spaced  
3 longitudinally along end post 17, are first and second coupling  
4 elements 30, 31. These coupling elements serve distinct  
5 functions and will be described more completely hereinafter. In  
6 the illustrated embodiment they are of similar configuration,  
7 acting as both fasteners and followers; however, it will be  
8 obvious to those skilled in the art, that distinct configurations  
9 may be selected to cooperate effectively with the specific design  
10 chosen to implement the functions and features of the related  
11 guide element or latching guide mechanism.

12 Mounted within the face surface of side post 22 of crib  
13 side 14, there is a guide element 40 and a latching/guide  
14 mechanism 50. When assembled, as illustrated in Fig. 1, upper  
15 coupling element 30 is engaged in the track 42 of guide element  
16 40, and lower coupling element 31 is nested within the channel 60  
17 of latching/guide mechanism 50.

18 Fig. 3 is an enlarged view of end post 17 when engaged  
19 with side post 22 by means of coupling element 31 and  
20 latching/guide mechanism 50. In the position shown, the head 84  
21 of coupling element 31 is trapped between a resiliently biased  
22 follower 52 and a dividing partition 64 within latching/guide  
23 mechanism 50. The interaction between coupling element 31 and  
24 latching/guide mechanism 50 will be understood by consideration  
25 of the structure of the latching/guide mechanism as illustrated

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1 in Figs. 4 through 10.

2 Fig 4 shows latching/guide mechanism 50 mounted within  
3 a cavity 27 in side post 22. The depth of the latching/guide  
4 mechanism 50 and that of cavity 27, are substantially the same so  
5 that the surface of the mechanism housing 51, is flush with the  
6 surface of side post 22. Latching/guide mechanism 50 is held in  
7 position with fasteners 56, 57 which are countersunk to insure  
8 that they too are beneath the surface of side post 22.

9 In the preferred embodiment, illustrated in Figs. 5-7,  
10 latching/guide mechanism 50 will be seen to comprise an elongated  
11 housing 51 with a latching chamber 63 at the lower end and a  
12 longitudinally disposed guide channel 60. Housing 51 is  
13 essentially a solid component, made of either plastic or metal.  
14 It includes channel 60, of constant depth, extending from top to  
15 bottom. Section 61, of channel 60, extends longitudinally from  
16 one side of latching chamber 63, inclining slightly in order to  
17 attain a central position at the top of the housing. Section 62,  
18 of channel 60, lies adjacent the bottom of section 61, creating a  
19 top for the latching chamber 63 with a projecting partition 64  
20 separating the two sections. The width of channel 60, in both  
21 sections, is selected to permit nesting and guidance of coupling  
22 element 31. Thus, for example, the head of coupling element 31  
23 is illustrated in Fig. 4 by dashed outline.

24 Within latching chamber 63, housing 51 includes two  
25 short posts 67, 68 for mounting and guidance of springs 53, 54

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1 (illustrated in Fig. 8 and to be described hereinafter). At the  
2 back of latching chamber 63, an aperture 66 extends up and beyond  
3 partition 64 to provide a retaining channel for the mounting  
4 tongue 78 of a latching cam 52 (illustrated in Fig. 10 and to be  
5 described hereinafter). In addition, at the upper end of channel  
6 60, an aperture 70 is provided for convenience in mounting a  
7 bumper element. Shouldered cavities 71, 72 are advantageously  
8 furnished at the ends of housing 51, to accept fasteners 56, 57  
9 for securing latching/guide mechanism 50 within side post 22.

10 Latching cam 52 is a tongued element, adapted for  
11 mounting to move vertically within latching chamber 63. As shown  
12 in Figs. 8-10, latching cam 52 comprises a body portion 75 having  
13 a camming surface 79 and a projecting tongue 78. Holes 76, 77  
14 are provided in the end of the cam remote from the camming  
15 surface 79, to receive biasing springs 53, 54. Camming surface 79  
16 bears upon and guides coupling element 31 between sections 61, 62  
17 of channel 60 when an operator raises or lowers crib side 14.

18 Latching cam 52 is mounted within housing 51, with  
19 tongue 78 projecting through cavity 66 and along the extension 69  
20 thereof. Springs 53, 54 are mounted upon pins 67, 68 and into  
21 cavities 76, 77 of latching cam 52. Thus, the cam is resiliently  
22 biased in an upward direction into contact with dividing  
23 partition 64 that separates sections 61 and 62 of channel 60.  
24 Latching cam 52 reacts to pressure from coupling element 31 on  
25 camming surface 79 to move downward against the bias of springs

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1 53, 54, thereby permitting coupling element 31 to move from  
2 section to section of channel 60, under the control of an  
3 operator.

4 It should be appreciated that while carrying out  
5 latching and locking operations, the releasable side of the crib  
6 is moved, while the crib itself remains stationary. Thus,  
7 vertical and horizontal movements of the crib side in which  
8 latching/guide mechanism 50 is mounted, provide the initiating  
9 forces that cause interaction between stationary coupling element  
10 31 and latching/ guide mechanism 50.

11 The description of components has been directed to the  
12 coupling between the left edge of crib side 14 and crib end 11.  
13 A corresponding coupling will be provided between the right edge  
14 of crib side 14 and the opposite end 12 of the crib. It will be  
15 understood that this corresponding coupling includes a  
16 latching/guide mechanism that is substantially a mirror image of  
17 the one described.

18 Returning attention to Fig. 2, the top of crib side 14  
19 is held in position and guided in travel, by coupling element 30  
20 and guide element 40; the former being fastened to project from  
21 end post 17 and the latter being mounted flush within the surface  
22 of side post 22.

23 As noted earlier, in this particular embodiment,  
24 coupling element 30 is identical to the coupling element 31, used  
25 to interact with latching/guide mechanism 50. It is shown in

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1 Fig. 11. The element comprises a threaded portion 81, a shoulder  
2 portion 82, and a head portion 84 separated from the shoulder by  
3 a shank portion 83. When acting in conjunction with  
4 latching/guide mechanism 50, head portion 84 travels within  
5 channel 60 and interacts also with latching cam 52 in latching  
6 chamber 63. When acting in conjunction with guide element 40,  
7 shank portion 83 constrains coupling element 30 to stay within  
8 particular track 42 while head portion 84 couples crib side 14 to  
9 crib end 17.

10 Fig 12 shows guide element 40, mounted flush near the  
11 top and within the face of side post 22. It includes an  
12 elongated track 42 having a length substantially equal to that of  
13 section 61 of channel 60, in latching/guide mechanism 50. Track  
14 42 encloses a cavity within side post 22 and has an opening  
15 throughout its length, slightly greater than the diameter of  
16 shank portion 83 of coupling element 30. A larger opening 43 is  
17 provided at the top of track 42, to permit passage into the  
18 cavity, of head 84 of coupling element 30. Thus, when side 14 is  
19 assembled to crib ends 11, 12 the upper portion of crib side 14  
20 is constrained to move only vertically, while simultaneously  
21 acting as a brace holding the tops of ends 11, 12.

22 Return to Figs. 3 and 4, and consider the interaction  
23 of coupling element 31 and latching/guide mechanism 50. Head 84  
24 of coupling element 31 projects into channel 60 of latching/guide  
25 mechanism 50. Due to the force of gravity upon side 14, the lower

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1 tip of partition 64 is pressing against head 84. The cam surface  
2 of latching cam 52 is pressed upward into contact with head 84  
3 under the action of the biasing springs 53, 54. This is only a  
4 transitory position and is not stable. Slight horizontal  
5 movement of post 22, i.e. side 14, will cause it: to move  
6 inwardly and drop slightly to trap coupling element 31 at the top  
7 of section 62, locking side 14 in a raised position; or to move  
8 outwardly sliding down with coupling element 31 in section 61  
9 until it comes to rest in contact with bumper 55, leaving side 14  
10 in a lowered position.

11 With an understanding of the crib structure and  
12 hardware, the operations of raising, lowering and locking  
13 releasable side 14 can be described. Refer to Figs. 4 and 12.  
14 When the crib is assembled, guide element 40 and latching/guide  
15 mechanism 50 are vertically disposed at the top and bottom edges  
16 of crib side 14. Coupling elements 30, 31 are fastened to end  
17 post 17, spaced so that each falls within the same portion of the  
18 transit path through their respective guides 42, 61. For purpose  
19 of example, coupling element 30 is shown on phantom outline  
20 within track 42 of guide element 30 and coupling element 31 is  
21 shown in phantom outline within section 61 of latching/guide  
22 mechanism 50.

23 When crib side 14 is in its uppermost position,  
24 coupling elements 30 and 31 are disposed at the lowermost  
25 portions of guide element 40 and latching/guide mechanism 50.

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1 When crib side 14 is locked in the raised position, coupling  
2 element 31 is nested in latching chamber 63 at the top of section  
3 62. It is held in this position by the weight of crib side 14.  
4 To lower crib side 14, the operator first pulls it upward  
5 slightly, while simultaneously pulling the bottom outward (post  
6 22 moves to the right as viewed in Fig. 4). This forces coupling  
7 element 31 down against camming surface 79 of cam 52, around and  
8 past the point of partition 64, and into section 61 of channel  
9 60. As crib side 14 is lowered, coupling element 31 guides it  
10 along section 61 until stopped when it contacts bumper 55. Crib  
11 side 14 is now down.

12 To raise side 14 and lock it in its uppermost position,  
13 the operator simply pulls it upward, causing the side to rise  
14 within section 61 guided by coupling element 31 until it comes  
15 into contact with camming surface 79 of latching cam 52. Due to  
16 the contour of surface 79, as upward motion continues the side is  
17 pressed inwardly (post 22 moves to the left as viewed in Fig. 4)  
18 and coupling element 31 traverses surface 79 of latching cam 52  
19 to its lower end where it is free to move up into section 62 of  
20 channel 60 as the operator releases crib side 14. Crib side 14  
21 has now been raised and locked in its uppermost position.

22 A particular embodiment of the invention has been shown  
23 and described. The invention relates to a combination of  
24 components and their interrelationship to one another. It also  
25 relates specifically to the structure and operation of crib

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1 hardware. It will be apparent to those skilled in the art that  
2 the unique hardware of the invention can be fabricated of  
3 numerous materials and furthermore that the structure of the  
4 components may be modified. In so far as such modifications come  
5 within the spirit of the invention, they are contemplated by the  
6 inventor and are intended to come within the scope of the  
7 following claims.

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## WHAT IS CLAIMED IS:

- 1        1. A crib having a releasable side disposed between  
2        first and second crib ends with gaps therebetween; a vertical  
3        post at each end of said releasable side; coupling means secured  
4        within each said end, projecting into and beyond said gaps;  
5        latching/guide means within the surface of the edge of each said  
6        posts facing each said end; and control means within said  
7        latching/guide means engaging said coupling means to releasably  
8        hold said side in a first vertical position and to guide the  
9        vertical movement of said side to a second vertical position.
  
- 1        2. A crib as defined in claim 1, said coupling means  
2        being located entirely within the central portion of the vertical  
3        path traversed during movement of said side from said first to  
4        said second vertical position, whereby said coupling means are  
5        never visible above or below said vertical posts.
  
- 1        3. A crib as defined in claim 1, wherein said control  
2        means include a channel constraining vertical movement of said  
3        side, and cam means effecting latching of said side into said  
4        first vertical position responsive to moving said side a first  
5        predetermined distance in an upward direction, followed by the  
6        release thereof.

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1           4. A crib as defined in claim 3, wherein said  
2        said cam means effects unlatching of said side from said first  
3        vertical position responsive to moving said side a second  
4        predetermined distance in an upward direction, followed by  
5        horizontal movement of said side.

1           5. A crib as defined in claim 4, wherein said  
2        second predetermined distance is less than said first  
3        predetermined distance.

1           6. A crib as defined in Claim 3, wherein said control  
2        means includes a channel engaging said coupling means for guiding  
3        the translation of said side along a substantially longitudinal  
4        path, with latching means at one end of said channel for engaging  
5        said coupling means to prevent vertical movement of said side.

1           7. A crib as defined in Claim 6, wherein said  
2        latching means comprises a latching chamber at the end of said  
3        channel with a locking channel adjacent to said first-mentioned  
4        channel and biased cam means disposed to guide the coupling means  
5        into said locking channel when said side is pulled upward against  
6        said cam means.

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1           8. A crib as defined in Claim 7, wherein said  
2 latching chamber includes a downward projecting partition  
3 separating said locking channel from said first-mentioned channel  
4 with a connecting passage therebetween, said passage being  
5 blocked by said cam means when in its quiescent condition and  
6 being open when said cam means is depressed, whereby said  
7 coupling means is released from said locking channel by raising  
8 said side and pushing it in the direction of said locking  
9 channel.

1           9. A crib as defined in claim 1, including additional  
2 guide means above said latching/guide means within the surface of  
3 the edge of each said posts facing each said end; wherein said  
4 coupling means comprise first and second rigid elements  
5 longitudinally displaced from one another along a substantially  
6 vertical axis on each crib end; the top one of said rigid  
7 elements being positioned to engage said additional guide means,  
8 and the bottom one of said rigid elements being positioned to  
9 engage said latching/guide means.

1           10. A crib as defined in claim 9, wherein said  
2 coupling means comprises a projecting body of predetermined  
3 dimensions with a remote end larger than that of said body, said  
4 additional guide means including a structure to engage said  
5 remote end and prevent horizontal movement between said crib ends  
6 and said vertical posts.

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1                   11. A crib as defined in Claim 10, wherein the  
2 structure of said additional guide means engages the top one of  
3 said rigid elements constraining the top of said side to  
4 substantially vertical movement only.

1                   12. Hardware for releasably mounting a movable element  
2 adjacent to a stationary element to control vertical translation  
3 of said movable element relative to the stationary element,  
4 comprising: elongated latching/guide means adapted to be mounted  
5 within a channel in said movable element, and coupling means  
6 adapted to be mounted projecting from said stationary element,  
7 the coupling means and latching/guide means being engageable to  
8 yield minimal spacing between said elements and to constrain  
9 movement therebetween to translation along the longitudinal axis  
10 of the latching/guide means.

1                   13. Hardware as defined in claim 12, including control  
2 means within said latching/guide means engaging said coupling  
3 means to releasably hold said latching/guide means in a first  
4 vertical position and to guide the vertical movement of said  
5 latching/guide means to a second vertical position.

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1           14. Hardware as defined in claim 13, wherein said  
2 control means include a channel constraining vertical movement of  
3 said latching guide means, and cam means effecting latching of  
4 said latching/guide means into a first vertical position  
5 responsive to moving said latching/guide means a first  
6 predetermined distance in an upward direction, followed by the  
7 release thereof.

1           15. Hardware as defined in claim 14, wherein said  
2 said cam means effects unlatching of said latching/guide means  
3 from said first vertical position responsive to moving said  
4 latching/guide means a second predetermined distance in an upward  
5 direction, followed by horizontal movement thereof.

1           16. Hardware as defined in Claim 15, wherein said  
2 control means includes a channel engaging said coupling means for  
3 guiding the translation of said latching/guide means along a  
4 substantially longitudinal path, with latching means at one end  
5 of said channel for engaging said coupling means to prevent  
6 vertical movement of said latching/guide means.

1           17. Hardware as defined in Claim 16, wherein said  
2 latching means comprises a latching chamber at the end of said  
3 channel with a locking channel adjacent to said first-mentioned  
4 channel and biased cam means disposed to guide the coupling means  
5 into said locking channel when said latching/guide means is  
6 pulled upward against said cam means.

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1           18. Hardware crib as defined in Claim 17, wherein said  
2 latching chamber includes a downward projecting partition  
3 separating said locking channel from said first-mentioned channel  
4 with a connecting passage therebetween, said passage being  
5 blocked by said cam means when in its quiescent condition and  
6 being open when said cam means is depressed, whereby said  
7 coupling means is released from said locking channel by raising  
8 said latching/guide means and pushing it in the direction of said  
9 locking channel.

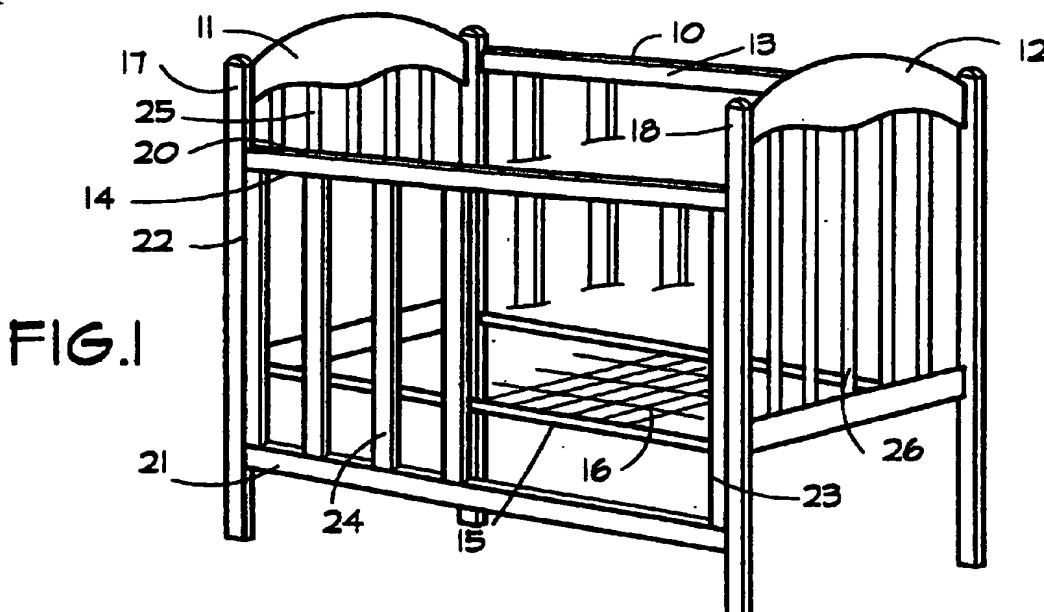


FIG. 12

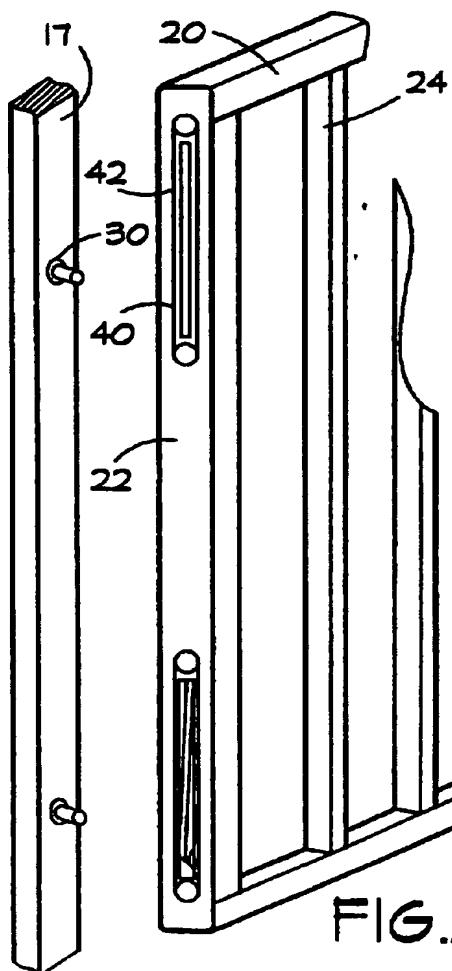
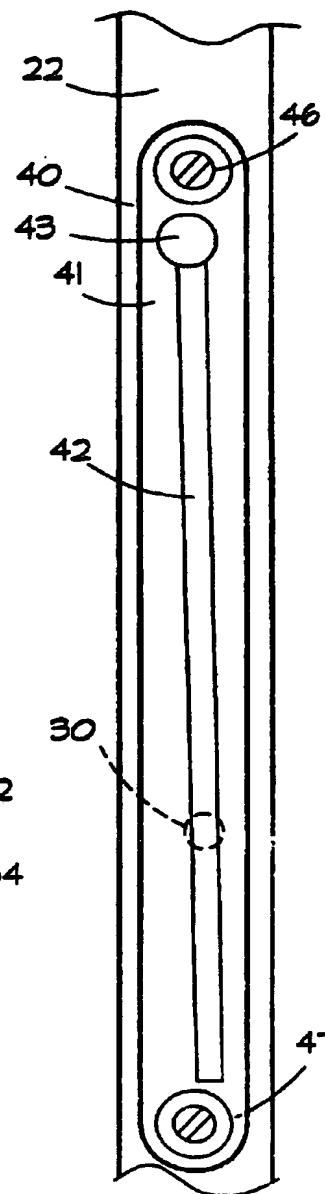
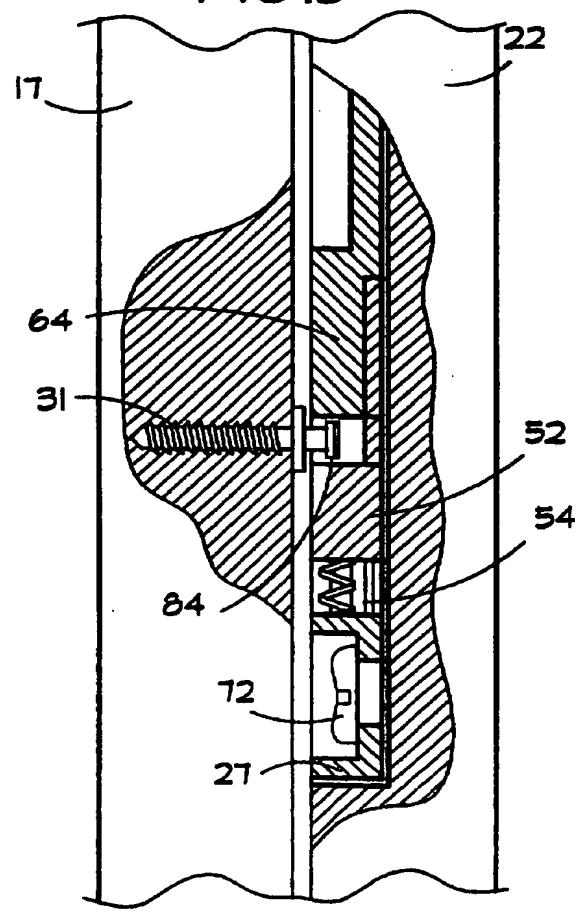


FIG. 3



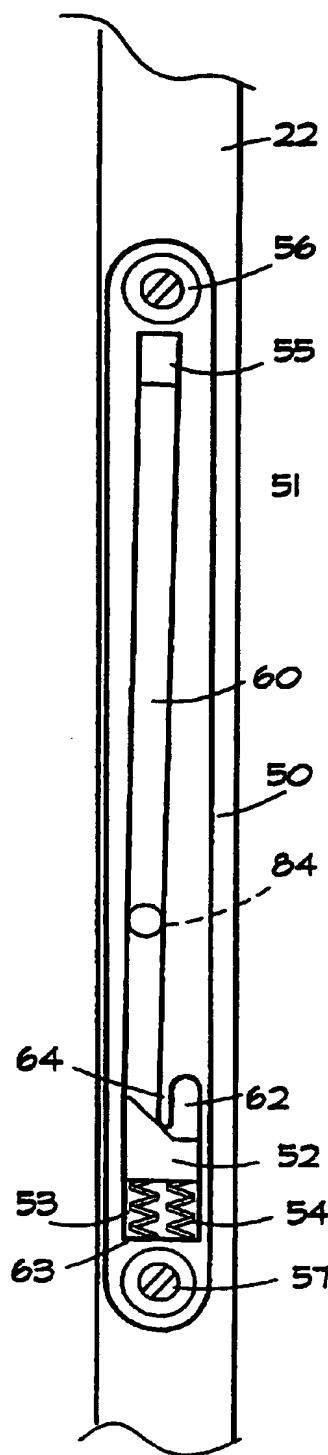


FIG. 4

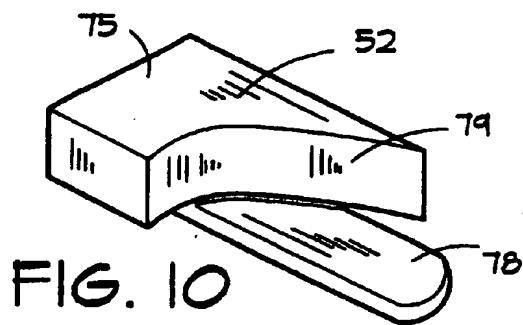


FIG. 10

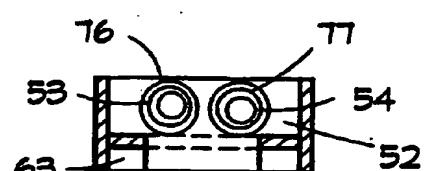


FIG. 9

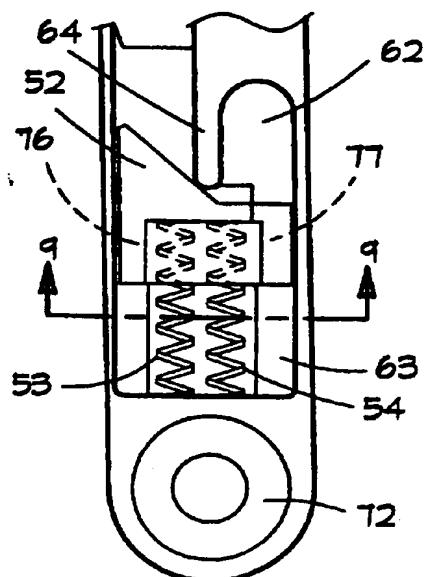


FIG. 8

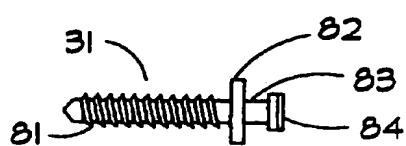


FIG. 11

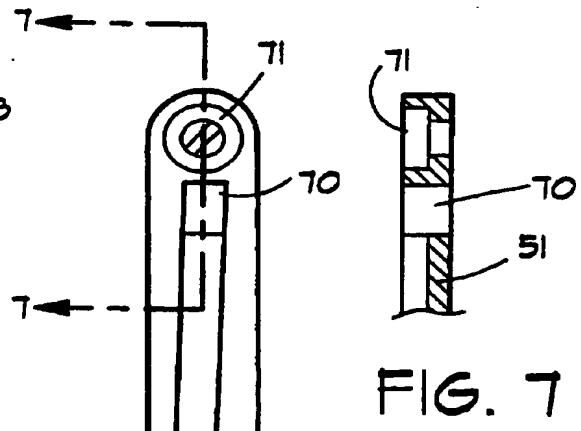


FIG. 7

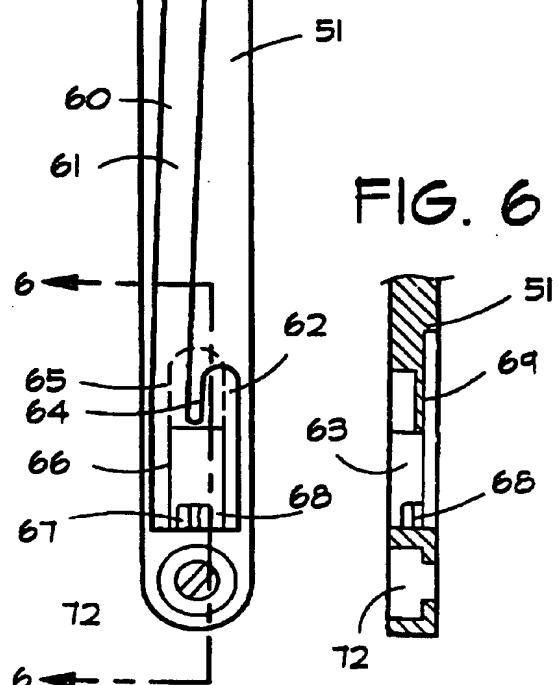


FIG. 6

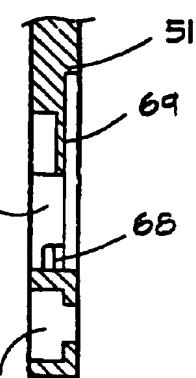


FIG. 5

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